050051

FLOOD INSURANCE STUDY

CITY OF MOUNTAINBURG, ARKANSAS
CRAWFORD COUNTY

OCTOBER 15, 1980

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER -050051

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
CITY OF MOUNTAINBURG, ARKANSAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazard in the City of Mountainburg, Crawford County, Arkansas, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Mountainburg to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Garver & Garver, Inc., for the Federal Insurance Administration, under Contract No. H-4746. This study was completed in October 1979.

1.3 Coordination

Flooding within the City of Mountainburg and the selection of streams for the study were discussed in a meeting in April 1978, attended by local citizens and officials of the City of Mountainburg, representatives of Garver & Garver and personnel of the Dallas Regional Office of the FIA.

OnMay 3, 1974, the results of the study by Garver & Garver, Inc., were reviewed at a final coordination meeting attended by personnel from Garver & Garver, Inc., the FIA and community officials.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Mountainburg, Crawford County, Arkansas. The area of study is shown on the Vicinity Map (Figure 1).

Floods caused by the overflow of Frog Bayou, Clear Creek and Pigeon Creek, were studied in detail. These areas were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through October 1984.

The flood hazard data presented in this report reflect the current conditions. No future flood control projects nor any increases in runoff due to future urbanization were included in the analyses.

2.2 Community Description

Mountainburg is located in the northeastern part of Crawford County, Arkansas, partially within and adjacent to the flood plains of Frog Bayou, Clear Creek and Pigeon Creek. U.S. Highway 71, Arkansas Highway 282, and the St. Louis-San Francisco Railway cross the study area. In 1845 the present site of Mountainburg was registered as "The Narrows" as Van Buren, the county seat. The name was changed to "Mountainburgh" in September 1876 and changed again to "Mountainburg" in 1893.

In 1832, Mountainburg was a vast wilderness of virgin timber. With the completion of the railroad in 1882, the city began to grow. Early shops included a blacksmith shop, a wagon shop, a gin, and a mill. Today, the shipment of post, timbers and ties, the culture of fruits, particularly apples, peaches, and berries, and cattle and poultry production are the leading industries. The farmland around Mountainburg produces some wheat, oats, barley, and cotton. A 1978 Census showed 524 people in Mountainburg, an increase of 122 over the 1960 Census (Reference 1).

Mountainburg has an average annual temperature of 58 degrees F. Temperatures range from near 2 degrees F in the winter to100 degrees F in the summer. Mountainburg has an average annual precipitation of 49 inches (Reference 2).

Soils in the study area are of two general types. Approximately 80 percent of Mountainburg is well drained, moderately deep and shallow, loamy and stony soils on hills, mountains, and ridges. The southeastern part of Mountainburg contains well drained, gently sloping, deep, loamy, and stony soils on hills and mountains (Reference 3).

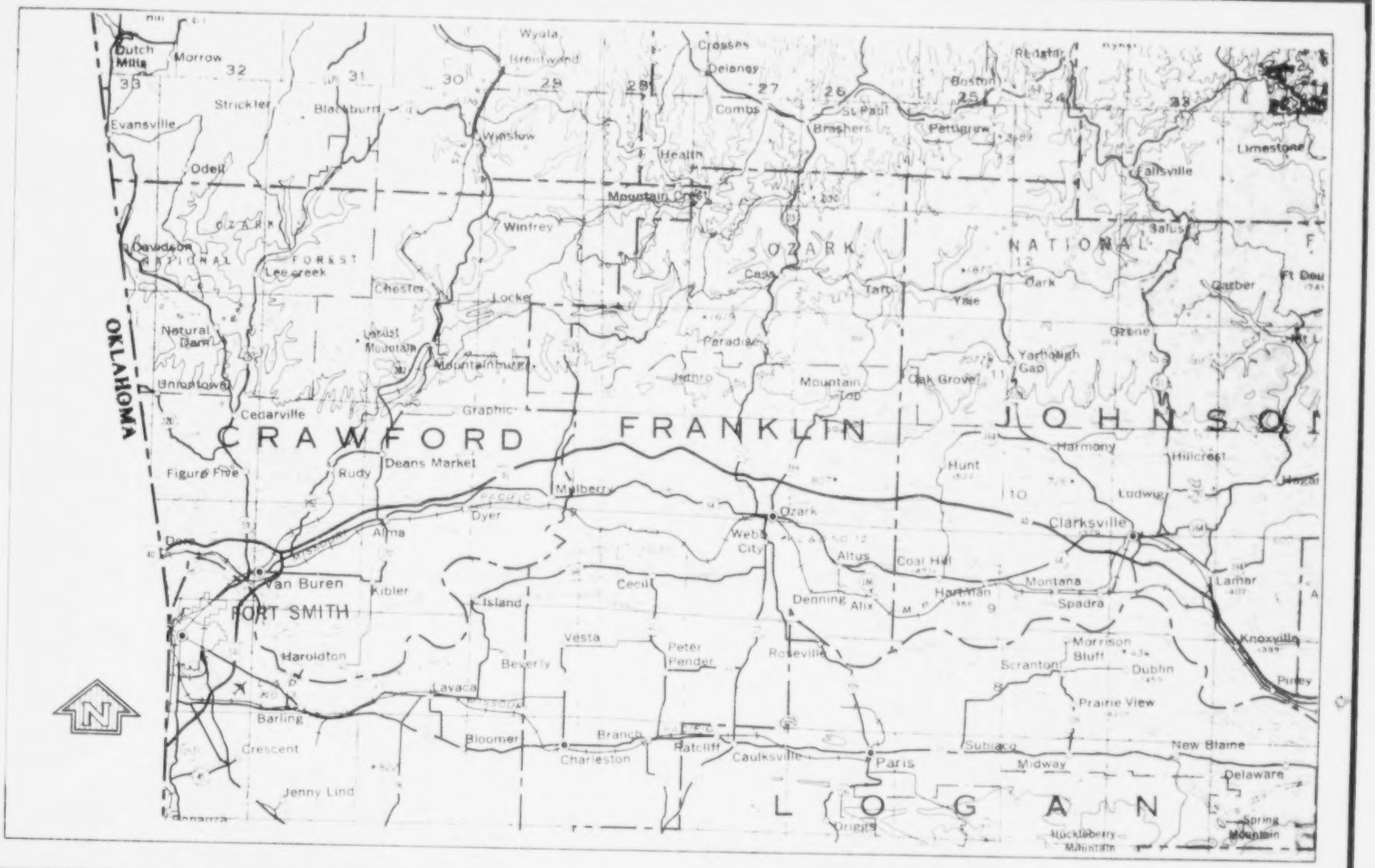


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF MOUNTAINBURG, AR

(CRAWFORD CO.)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

Mountainburg is located in a valley in Northwest Arkansas, about seventeen miles east of the Oklahoma state line. It's bordered on the east by the hills of the Ozark National Forest and on the west by the flatter terrain along Frog Bayou.

Frog Bayou, Clear Creek, and Pigeon Creek have drainage areas greater than one square mile. Clear Creek and its tributaries flow westward across the northern edge of Mountainburg, emptying into Frog Bayou. Pigeon Creek flows westward across the southern tip of Mountainburg, also emptying into Frog Bayou. Frog Bayou enters Mountainburg north of Felix Doyle Road, passes through the northern portion of the city, and empties into the Arkansas River at the boundary line between Crawford and Sebastian Counties.

Clear Creek flows through Lake Fort Smith near the northwest corner of Mountainburg. Lake Fort Smith is a small reservoir used to supply domestic water to the City of Fort Smith. Since the Lake was not designed as a flood control reservoir it was assumed that it would not have any effect on flood flows in this study.

2.3 Principal Flood Problems

Mountainburg is subject to periodic flooding caused by the overflow of Frog Bayou, Pigeon, and Clear Creeks. The steep terrain to the north of the city results in fast runoff which tends to exceed the capacity of the streams in the valley around Mountainburg.

2.4 Flood protection Measures

There have been no significant changes made to improve the flooding conditions along Frog Bayou, Pigeon Creek, or Clear Creek.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood

which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

Synthetic storms were computed to define the discharge-frequency data for Frog Bayou, Pigeon Creek, and Clear Creek. Rainfall distribution for the 10-, 50-, and 100-year frequencies were computed from rainfall-frequency data contained in the National Weather Service Technical Paper No. 40 (Reference 4). Snyder's Coefficients were used to compute unit hydrographs for the stream. The hydrographs and rainfall distributions were used to compute synthetic storms of the desired frequencies, from which the peak discharges were obtained. A Log-Probability relationship of the lower frequency peak discharges was used to compute each of the 500-year peak discharges.

Flows on Frog Bayou were computed above the mouth of Clear Creek, at the mouth of Clear Creek, and at the lower limit of the study. The hydrographs computed for the area above Clear Creek were used to determine the flows from the upper limit of the study to Clear Creek. These hydrographs were combined with the hydrograph for Clear Creek at its mouth to determine the flows below the mouth of Clear Creek. A hydrograph was computed at the lower limit of the study to determine peak flows for the entire basin. The peak flows were varied by a drainage area-discharge relationship from the mouth of Clear Creek to the lower limit of the study.

The peak flows on Frog Bayou decrease from the mouth of Clear Creek to the lower limit of the study. This decrease in flow is caused by the storage effect which is created when the flood flows enter the valley adjacent to Mountainburg from the steeper terrain around the community.

The flows for Clear Creek were computed only at U.S. Highway 71. The flows were not varied along Clear Creek since an extremely short reach with very little change in drainage area, was studied.

The flows for Pigeon Creek were computed at its mouth and at the upper limit of the study. The ratio of these peak flows along the study reach were determined using a drainage area-discharge relationship.

The peak discharge-drainage area relationships for the selected recurrence intervals are shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
CLEAR CREEK					
Cross Section B	78.5	22,929	30,925	34,506	43,800
U.S. Hwy. 71	87.5	18,018	23,687	26,505	32,000
PIGEON CREEK					
Mouth	2.6	3,466	4,483	4,996	6,005
U.S. Hwy. 71	2.1	3,415	4,420	4,945	5,985
Wall Street	2.2	3,405	4,408	4,920	5,950
Cross Section E	1.6	3,384	4,347	4,848	5,830
FROG BAYOU					
Cross Section A	164.0	30,491	41,052	45,859	56,350
Arkansas Hwy. 282	161.0	31,200	42,100	46,800	58,000
Felix Doyle Rd.	158.0	32,000	43,100	48,150	59,300
St Louis-San Francisco Railway	156.0	32,800	43,900	48,900	60,200
Cross Section J	135.0	41,421	55,131	61,489	75,300
Cross Section K	47.0	20,664	27,170	30,274	36,150

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail in the City of Mountainburg were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the flood sources.

Below water sections of channels, bridges, and culverts were surveyed to obtain elevation data and structural geometry. Additional topographic information and overbank elevations on cross section were provided by aerial surveys.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For streams segments on which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Channel roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgement and based on field observations of the streams and flood plain areas. Roughness values for the main channel of Frog Bayou range from 0.045 to 0.065 with overbank roughness values ranging from 0.09 to 0.12 for all floods. Roughness values for the main channel of Pigeon Creek range from 0.05 to 0.06 with overbank roughness values ranging from 0.09 to 0.11 for all floods. Clear Creek has a main channel roughness value of 0.06 with overbank roughness values ranging from 0.09 to 0.12.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). Water-surface elevations of floods of the selected recurrence intervals were developed using the Corps of Engineers HEC-2 step-backwater computer program (Reference 5). Starting water-surface elevations for the various creeks were determined by computing rating curves for the channel cross sections at the lower limit of each study. Starting water-surface elevations were picked from these curves for the 10-, 50-, 100- and 500-year peak flows.

All elevations used in this study are referenced to National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Mean Sea Level Datum of 1929; elevation reference marks used in this study are shown and described on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is used to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the flood elevations at each cross section; between cross sections, the boundaries were interpolated using topographic maps produced from aerial surveys at a scale of 1:12,000 with a contour interval of 5 feet. In cases where the 100-year and the 500-year boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodway presented in this study was computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway widths were determined at cross sections; between cross sections, widths were interpolated and boundaries drawn. In cases where the floodway and the 100-year boundaries are close together, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Frog Bayou								
A*	149,790	400	4,202	10.9	687.0	687.0	688.0	1.0
B*[2]	150,690	1,000	7,597	6.2	690.8	690.8	691.8	1.0
C*	152,220	1,300	10,030	4.7	697.3	697.3	697.8	0.5
D*	152,380	1,500	16,575	2.8	701.2	701.2	701.3	0.1
E*	156,290	1,000	6,463	7.2	705.8	705.8	706.6	0.8
F*	160,930	1,200	10,454	4.5	723.3	723.3	723.9	0.6
G	164,520	700[3]	7,548	6.4	736.7	736.7	737.7	1.0
H	165,900	1,048	8,158	6.0	742.9	742.9	743.9	1.0
I	167,530	1,000	8,104	7.6	748.1	748.1	748.2	0.1
J	169,070	1,100[3]	8,635	3.5	754.8	754.8	755.8	1.0
K*	170,650	250	1,910	15.8	758.5	758.5	759.4	0.9
L*	171,340	418	6,027	5.0	766.3	766.3	766.4	0.1
Clear Creek								
A	396	658	4,838	7.1	751.0	747.4[4]	748.4	1.0
B	871	892	5,536	6.2	752.2	752.2	752.2	0.0
C	1,373	669	5,659	6.1	754.6	754.6	754.7	0.1

[1] Feet above mouth
[2] Common flood plain with Pigeon Creek
[3] This width extends beyond the corporate limits
[4] Water-surface elevation computed without the consideration of backwater effects

*Outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF MOUNTAINBURG, AR
(CRAWFORD CO.)

FLOODWAY DATA

FROG BAYOU-CLEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Pigeon Creek								
B*[2]	400	**	**	**	690.8	690.8	**	**
C	2,418	600[3]	1,984	2.5	702.3	702.3	702.6	0.3
D	3,854	255	1,218	4.1	729.2	729.2	729.2	0.0
E	4,002	400	2,220	2.2	732.2	732.2	732.2	0.0
F	4,393	400	740	6.7	734.7	734.7	735.4	0.7
G*	4,942	200[3]	625	7.8	745.9	745.9	746.0	0.1

[1] Feet above mouth
[2] Common flood plain with Frog Bayou
[3] Floodway extends beyond corporate limits
*Outside corporate limits
**Not determined

TABLE 2

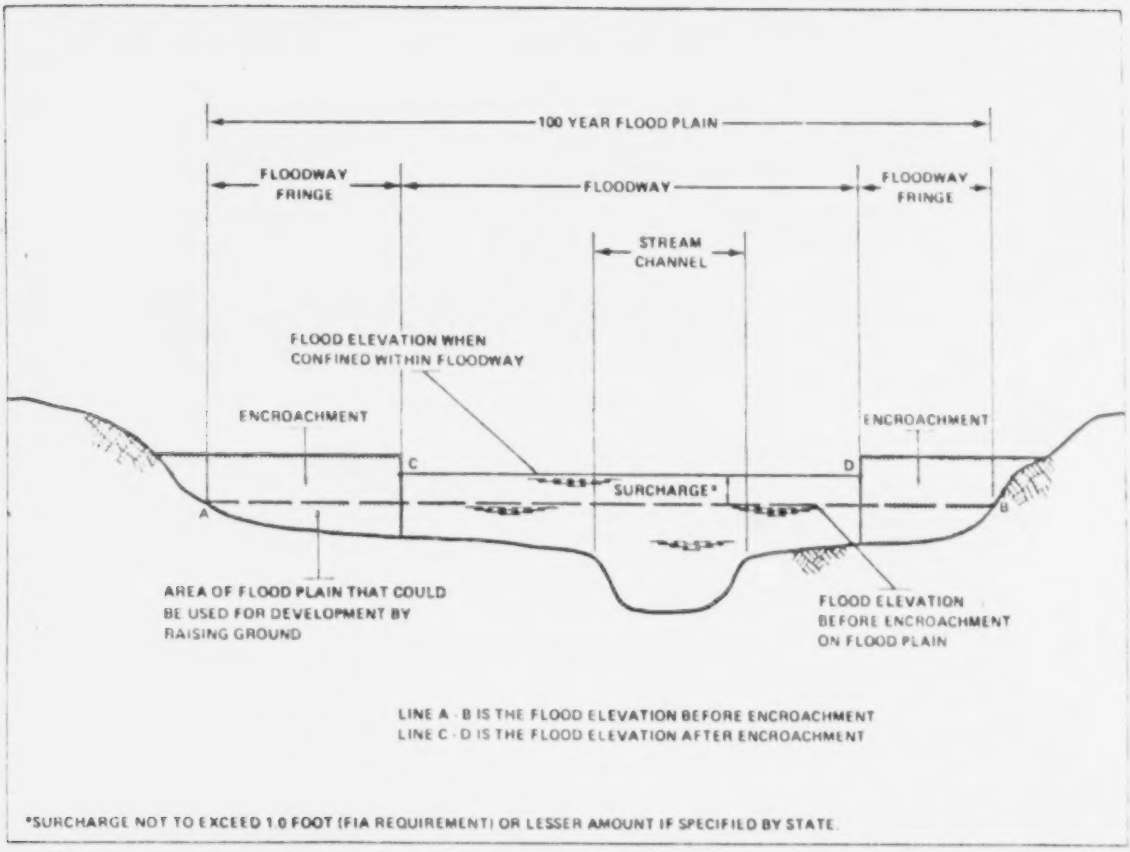
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF MOUNTAINBURG, AR

(CRAWFORD CO.)

FLOODWAY DATA

PIGEON CREEK


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source studied in detail affecting the City of Mountainburg.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Four reaches meeting the above criteria were required for the flooding sources of the City of Mountainburg. The location of the reaches was shown on the flood profiles and summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the City of Mountainburg was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zones A1, A2, A4: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.

Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City Mountainburg is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

In 1975 a Flood Hazard Boundary Map for the City of Mountainburg, Arkansas, was published by the FIA (Reference 6). This map was revised in November 1975, and was used to help determine the streams to be analyzed in this study.

The data presented here is authoritative for the purpose of the Flood Insurance program.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contracting the office of the Federal Emergency Management Agency, Insurance and Mitigation Division, Federal Center, Denton, Texas 76201.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Frog Bayou							
Reach 1	0005	-2.09	-0.61	+1.38	020	A4	Varies
Clear Creek							
Reach 1	0005	-2.10	-0.62	+1.48	020	A4	Varies
Pigeon Creek							
Reach 1	0005	-1.20	-0.48	+0.99	010	A2	Varies
Reach 2	0005	-0.51	-0.17	+0.31	005	A1	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF MOUNTAINBURG, AR

(CRAWFORD CO.)

FLOOD INSURANCE ZONE DATA

FROG BAYOU-CLEAR CREEK-PIGEON CREEK

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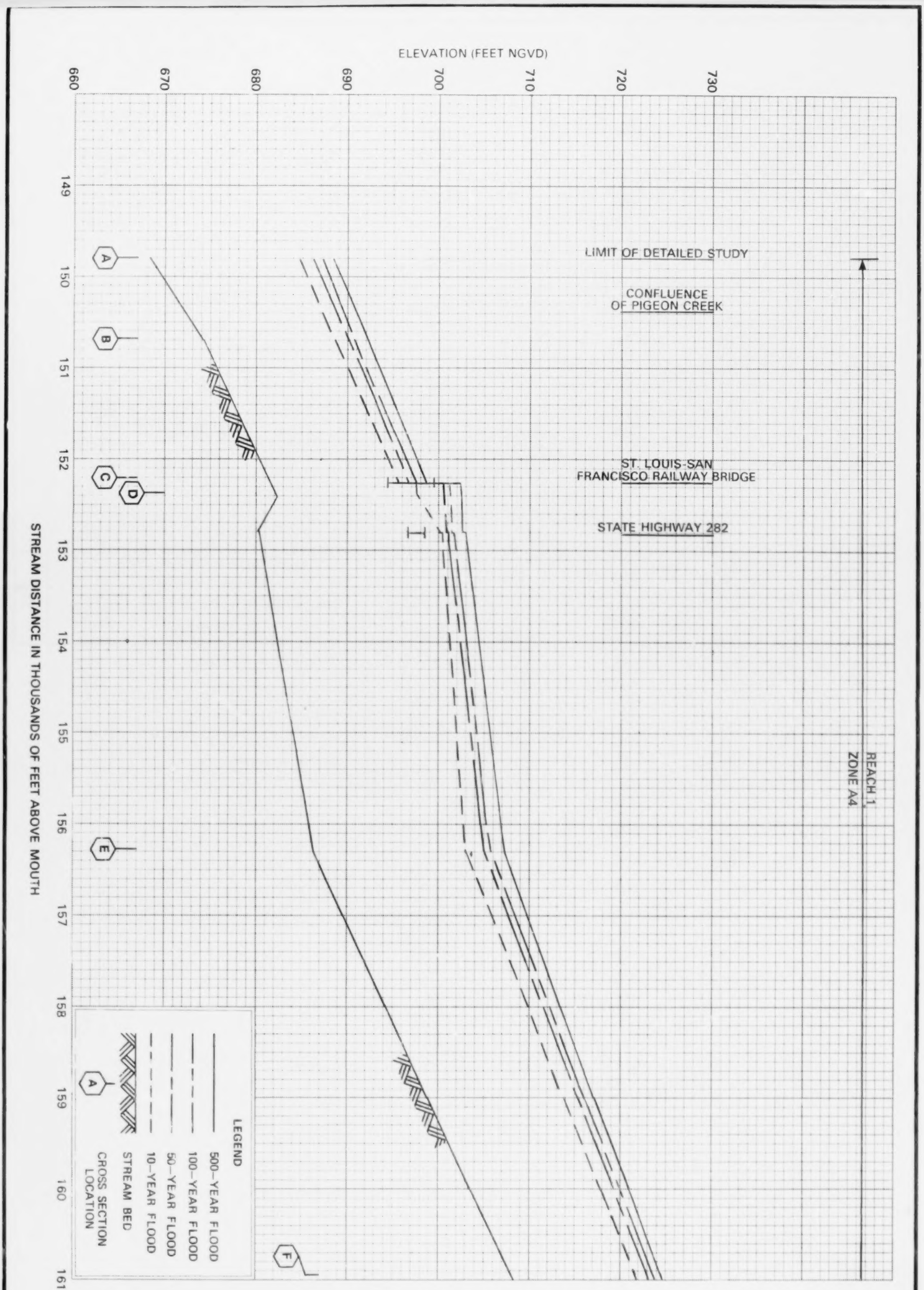
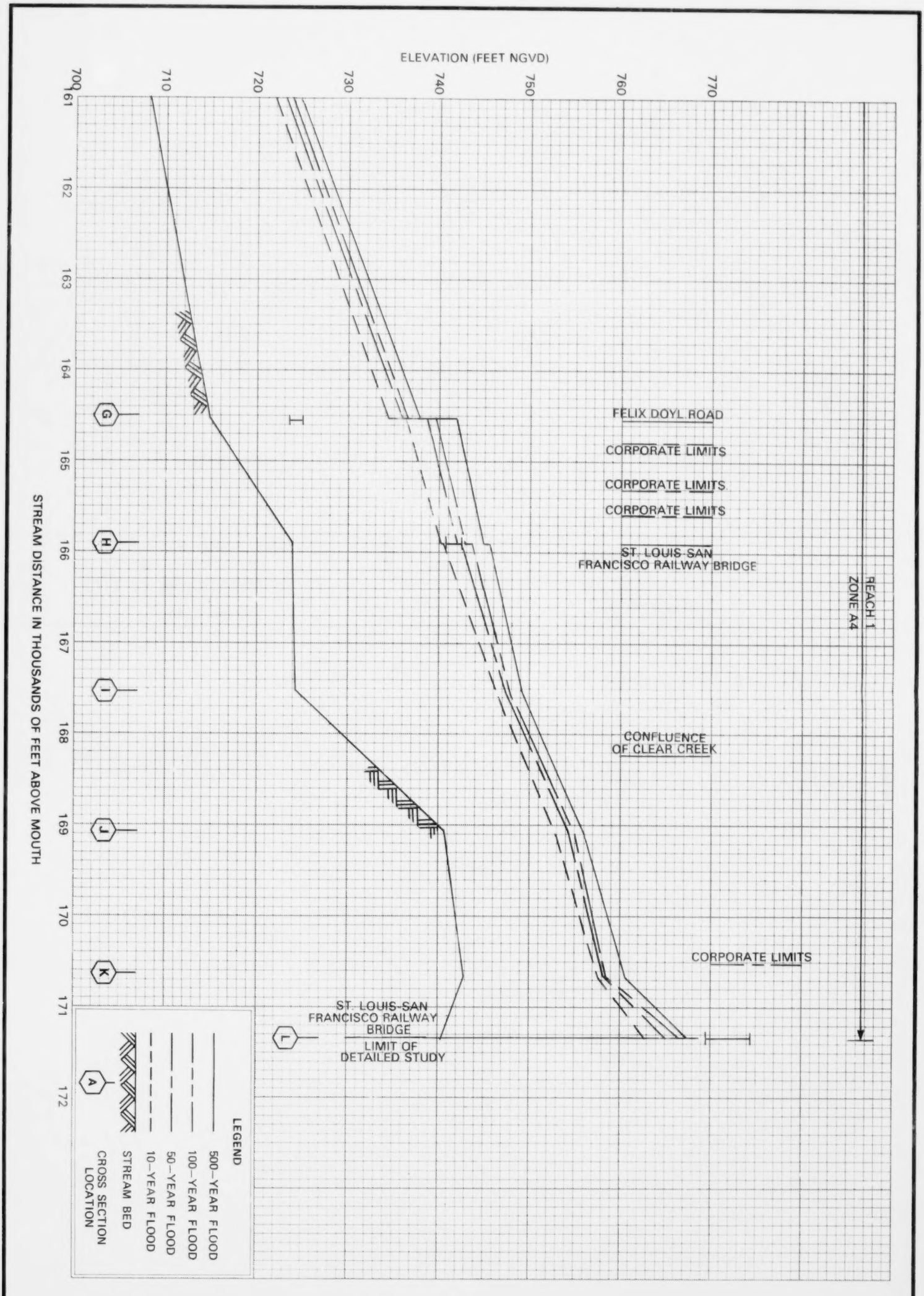
4. U.S. Weather Bureau Rainfall Frequency Atlas of the United States, Technical Paper No. 40, Washington, D. C. , 1961.

5. HEC-2 Water-Surface Profiles, Computer Program 723-X6-L202A, November 1976, The Hydrologic Engineering Center, Corps of Engineers, U. S. Army, Davis, California.

6. Flood Hazard Boundary Map, City of Mountainburg, Arkansas, 1974: Department of Housing and Urban Development, Federal Insurance Administration, Washington, D. C.



01P	FEDERAL EMERGENCY MANAGEMENT AGENCY Federal Insurance Administration **CITY OF MOUNTAINBURG, AR** (CRAWFORD CO.)	**FLOOD PROFILES** **FROG BAYOU**



02P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF MOUNTAINBURG, AR
(CRAWFORD CO.)

FLOOD PROFILES

FROG BAYOU

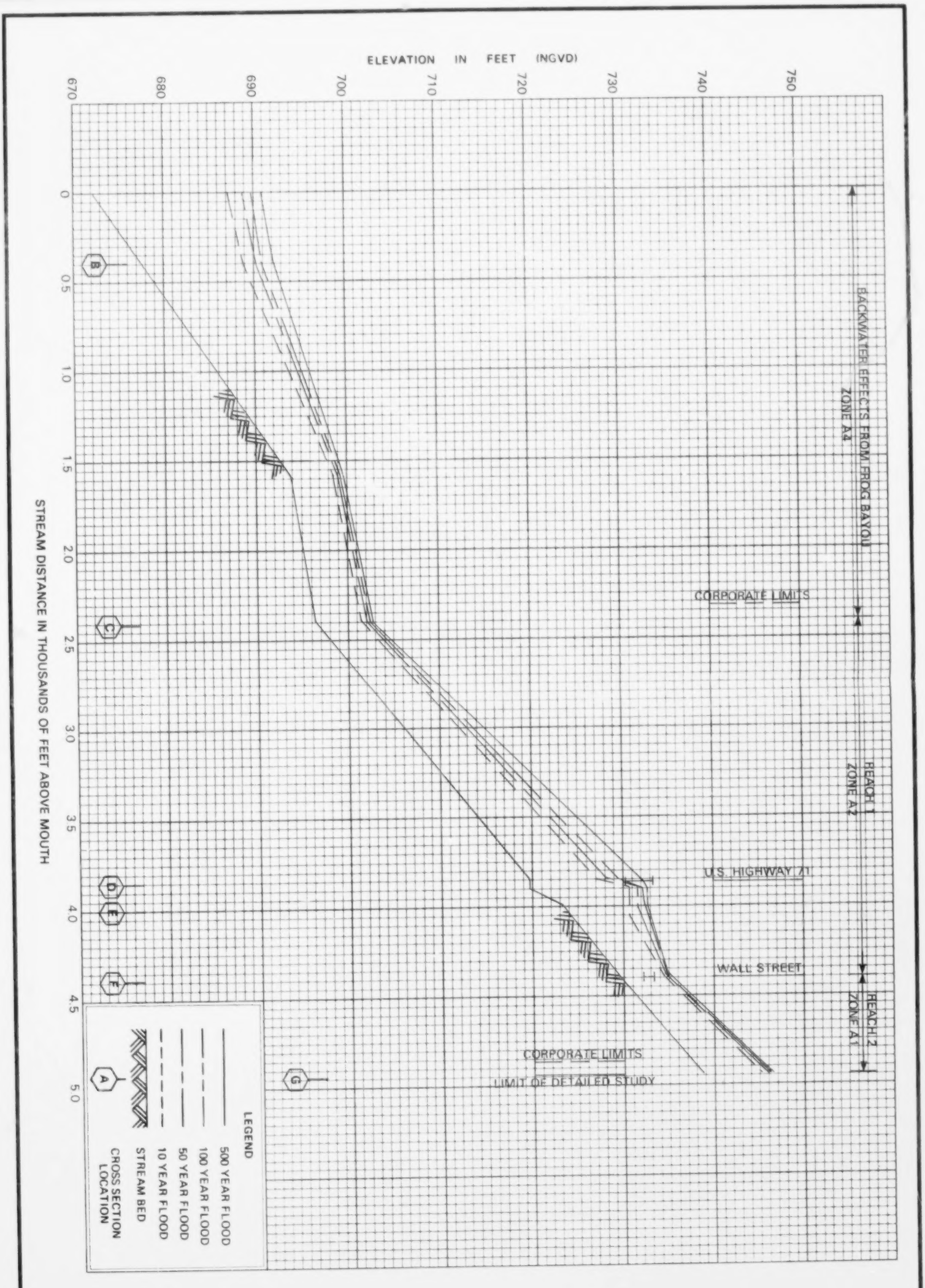
FLOOD PROFILES

CLEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF MOUNTAINBURG, AR
(CRAWFORD CO.)

03P



04P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF MOUNTAINBURG, AR
(CRAWFORD CO.)

FLOOD PROFILES

PIGEON CREEK